

Krantiguru Shyamji Krishna Verma

# Kachchh University

Mundra Road

Bhuj – 370001

Effective from June 2016

## SYLLABUS

**B.Sc Semester V: (Five)**

# ZOOLOGY

**Three papers:**

<b>Semester – V (Three papers)</b>
<b>CEZO CEZO -507: General Chordata and Comparative Anatomy</b>
<b>CEZO -508: Ecology, Evolution and Genetics</b>
<b>CEZO -509: Biochemistry and basic Biophysics</b>

**KSKV Kachchh University, Bhuj - Kachchh**

**Zoology Syllabus as CBCS System**

**Semester -V**

**Paper 507 (Theory)**

**CEZO -507: General Chordata and Comparative Anatomy**

Total Marks: 60

**UNIT I: Animal diversity (Chordata) (15 Marks)**

**1. Cephalochordate: Type: - Amphioxus**

i. Salient features of Cephalochordate, ii. Systemic position iii. External character

**2. Urochordata: i. Salient features of Urochordata ii. Systemic position**

**3. Cyclostomata: i. General characteristics ii. Systemic position**

**UNIT II: Type study – Chordata (through charts/ models/ multimedia) (15 Marks)**

1. Pigeon (*Columba livia*) - Classification, Habit & Habitat,

- External characters,
- Digestive system,
- Respiratory system & Air sacs,
- Brain
- Reproductive systems ,

**UNIT III: General Topics (15 Marks)**

1. Aves: As a successful flying machine – flight adaptations (morphological and physiological)

2. Aves: Structure of feathers, Types of feathers, Uses of feathers,

3. Migration: Reasons of migration, theories of migration, migration in birds and other vertebrates.

4. Adaptation of Marine mammals (Deep diving, swimming adaptation, thermoregulation, water conservation and sensory adaptations).

**UNIT IV: Comparative anatomy (15 Marks)**

Comparative anatomy of Heart

Comparative anatomy of Brain

Comparative anatomy of kidney

**Reference Books:**

**Modern Text book of Vertebrates** by R. L. Kotpal, Rastogi Publication, Meerut

**Chordata Zoology** by E. L. Jordan and P. S. Verma

**Integrated Principles of Zoology** by Hickman

**Cytology** by P. K. Gupta, S. Chand & Company, Delhi

**Jiv-Vigyan** by Nirav Prakashan

## Structure of the Question Paper for University exam

Semester V (Zoology) Paper No.

CEZO– 507: General Chordata and Comparative Anatomy

Total Mark: 60 (Total 4 units each carries 15 Marks)

Total Number of Question: 04

Question No.	Sub Question	Question Type	Mark
Question 1	A	*Short question (no internal option)	05
Unit I	B	Descriptive Questions with Internal Option	10
Question 2	A	Short question (No internal Option)	05
Unit II	B	Descriptive Questions with Internal Option	10
Question 3	A	Short question (No internal Option)	05
Unit III	B	Descriptive Questions with Internal Option)	10
Question 4	A	Short question (No internal Option)	05
Unit IV	B	Descriptive Questions with Internal Option	10

**Note:** Short questions may include: one to two line question/ definition/ drawing small figures/ filling the blanks/ multiple choice question/ match the pairs etc)

- The examination pattern of the university is 60% external and 40% internal
- Types of question for section 'A' may include: one to two line question/ definition/ drawing small figures/ filling the blanks/ multiple choice question/ match the pairs etc.
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- Minimum length of the submission is printed five A4 size pages.

**KSKV Kachchh University, Bhuj - Kachchh**  
**Zoology Semester V**

**Paper No.CEZO– 507: General Chordata and Comparative Anatomy**

**(PRACTICALS)**

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Identification and classification upto order giving reasons (Practical 1-2)

Practical 2: Study of Phylum Cephalochordata (Amphioxus)

Practical 2: Study of Phylum Urochordata (Ascidia, Salpa, Doliolum, Pyrosoma, Oikopleura)

Practical 4: Study of phylum Cyclostomata (Lamprey, Hagfish)

Practical 3: Type study (Chordata). Study of Pigeon (*Columba livia*) (**Using charts/multimedia/models**)

3.1 Study of external characteristics of Pigeon

3.2 Study of digestive system of Pigeon

3.3 Study of respiratory system of Pigeon

3.4 Study of Nervous system of Pigeon

3.5 Study of Reproductive system of Pigeon

Practical 4: Study of structure and types of feathers in birds (through charts/slide preparation)

Practical 6: Study of Marine mammals: Whale, dolphin, dugong (Through charts and specimens)

Practical 7: To study Comparative anatomy of Heart

Practical 8: To study comparative anatomy of Brain

Practical 9: To study comparative anatomy of Kidney

*Journal submission*

**KSKV Kachchh University, Bhuj - Kachchh**  
**(SKELETON QUESTION PAPER FOR PRACTICAL EXAMINATION)**

**ZOOLOGY (507): General Chordata and Comparative Anatomy**

Date: \_\_\_\_\_

Total Marks: 30

Time: 4 hours

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Q.1 Draw/Demonstrate & explain the \_\_\_\_\_ system of the given animal to examiner.

**06**

Q.2 Describe the structure and type of given feather.

**03**

Q.3 Identify specimens 1 to 6 as per instructions:

**12**

1. Identify and classify giving reason
2. Identify and classify giving reason
3. Identify and describe
4. Identify and do as directed (Marine mammal)
5. Identify and do as directed (Comparative anatomy)
6. Identify and do as directed (Comparative anatomy)

Q.4. Viva voice

**03**

Q. 5 Submission

**03**

Q.5 Journal

**03**

**KSKV Kachchh University, Bhuj - Kachchh**

**Zoology Syllabus as CBCS System**

**Semester -V**

**Paper 508 (Theory)**

**CEZO -508: Ecology, Evolution and Genetics**

Total Marks: 60

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**UNIT I: Ecology**

Marine Ecosystem in detail: Animals of intertidal area, challenges to intertidal fauna, Deep sea environment and adaptations, hydrothermal vents

Mangrove Ecosystem, its ecological role, status of mangroves in India and Gujarat

**UNIT II: Evolution**

Variation: Types of variation, Causes of variation

Isolation: Mechanism of isolation, Types of isolation, Geographical isolation, Reproductive isolation, Pre zygotic isolation, Post zygotic isolation, Origin of isolation.

Speciation: Definition, Allopatric, Peripatric, parapatric, sympatric

Role of Mutation in speciation

**UNIT III: General Topics**

**(15 Marks)**

Origin of Tetrapoda: in general

Origin of Amphibia

Origin of Reptiles

Dinosaurs: General description, Hypothesis/probable theories of extinction

**UNIT IV: Genetics**

**(15 Marks)**

Chromosome Structure, types of chromosomes (based on centromere),

Chromosomal aberrations.

Mutation: Causes, Types of mutations

Gene mutations

Karyotyping of Human chromosomes, Twins

**Reference Books:**

**Modern Text book of Vertebrates** by R. L. Kotpal, Rastogi Publication, Meerut

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**Integrated Principles of Zoology** by Hickman

**Cytology** by P. K. Gupta, S. Chand & Company, Delhi

**Jiv-Vigyan** by Nirav Prakashan

**Fundamentals of Ecology**, P. S. Odum, Saunders.

## Structure of the Question Paper for University exam

Semester V (Zoology) Paper No.

CEZO– 508: Ecology, Evolution and Genetics

Total Mark: 60 (Total 4 units each carries 15 Marks)

Total Number of Question: 04

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Question 1	A	*Short question (no internal option)	05
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Question 3	A	Short question (No internal Option)	05
Unit III	B	Descriptive Questions with Internal Option)	10
Question 4	A	Short question (No internal Option)	05
Unit IV	B	Descriptive Questions with Internal Option	10

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**KSKV Kachchh University, Bhuj - Kachchh**  
**Zoology Semester V**

**Paper No.CEZO– 508: Ecology, Evolution and Genetics**

**(PRACTICALS)**

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Practical 1: Study of Marine ecosystem

Practical 2: Plotting of Mangrove distribution on Maps (Gujarat and India)

Practical 3: Study of selected intertidal animals and their characters (Fiddler crab, Trocus, Neries, Sabella, Hermit crab, barnacles, sea anemone)

Practical 4: Study of different types of marine turtle.

Practical 5: Study of some important fauna of Kachchh. (GIB, Spiny tailed lizard, Wolf, Flamingoes, ..any other relevant may be added).

Practical 6: Study of Variations using said experiment/example

Practical 7: Study of various dinosaurs. (Brontosaurus, Triceratops, Tyranosaurus, Dimetrodon, Stegosaurus, Pteranodon, Ichthyosaurus, Iguanodon). Using photographs or models.

Practical 8: Preparation of human Karyotyping.

Practical 9: Studying types of mutation using diagrams (chromosomes and mutation diagrams).

Field Visit report

*Journal submission*



**KSKV Kachchh University, Bhuj - Kachchh**

**Zoology Syllabus as per CBCS System**

**Semester -V**

**Paper 509 (Theory)**

**CEZO -509: Biochemistry and basic Biophysics**

Total Marks: 60

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**UNIT I: Carbohydrates**

**(15 Marks)**

- Introduction, classification of carbohydrates, asymmetry
- Monosaccharides: Definition and general formula, classification upto hexoses (with structure of appropriate examples).
- Disaccharides: Definition, Classification based on glycosidic linkage, general description on Maltose, Lactose and Sucrose.
- Polysaccharides: Definition, Classification (Only flow chart), General properties of Starch, Glycogen, Cellulose, Chitin and Hyaluronic acid.
- Biological importance of carbohydrates

**UNIT II: Proteins**

**(15 Marks)**

- Classification of Proteins :
  - o Based upon shape - Globular and Fibrillar
  - o Based upon composition & solubility - Simple, Conjugated and Derived
- Biological importance of proteins
- Amino acids – In general

**UNIT III: Lipids and Enzymes**

- Lipids: Types of lipids,
- Classification of Lipids (Simple, compound and derived), Properties of lipids
- Biological importance of lipids
- Enzymes – Definition, Types of enzymes, Properties of enzymes
- Factors affecting enzyme activity/enzyme catalyzed reaction :
  - Temperature, b) pH, c) Inhibitors, d) Enzyme concentration, e) Substrate concentration

**UNIT IV: Biophysics and instrumentation**

**(15 Marks)**

- Basic structure ,working principals, function and application
  - Scanning Electron Microscope, Electron Microscope, Spectrophotometer, Ovens
  - AAS (Atomic Absorption Spectrophotometer), Micro pipette, Centrifuge.

**Reference Books:**

1. **Elementary Biochemistry**, J. L. Jain, S. Chand & Company, Delhi.
2. **Harper's Biochemistry**, Lange, McGraw-Hill.
3. **Principles of Biochemistry**, Lehninger, CBS Publications.
4. **Cytology**, P. S. Verma & V. K. Agarwal, S. Chand & Company, Delhi.
5. **Cellular and Molecular Biology**, De Robertis and De Robertis, Saunders Pub.

## Structure of the Question Paper for University exam

Semester V (Zoology) Paper No.

CEZO– 509: Biochemistry and basic Biophysics

Total Mark: 60 (Total 4 units each carries 15 Marks)

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**Zoology Semester V**

**Paper No.CEZO– 509: Biochemistry and basic Biophysics**

**(PRACTICALS)**

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Practical 1: Detection of Carbohydrates: Monosaccharides – Glucose and Fructose  
- Disaccharides - Lactose, Maltose and Sucrose

Practical 2: Detection of Proteins – Albumin and Casein

Practical 3: Preparation of atomic models of Carbohydrates. (as done in practical)

Practical 4: Preparation of atomic models of Proteins. (as done in practical)

Practical 5: Preparation of various graph for effect of temperature on enzymatic action.

Practical 6: Preparation of various graph for effect of pH on enzymatic action.

Practical 7: Preparation of various graph for effect of enzyme and substrate concentration on enzymatic action.

Practical 8: Study of various instruments/ Tools and techniques.

**KSKV Kachchh University, Bhuj - Kachchh**  
**(SKELETON QUESTION PAPER FOR PRACTICAL EXAMINATION)**

**ZOOLOGY (509): Biochemistry and basic Biophysics**

**Date:** \_\_\_\_\_ **Total Marks: 30** **Time: .....**

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- Q.1 Detect any two constituents from the given unknown solution and show your tests to the examiner. 07
- Q.2 Prepare the atomic model of \_\_\_\_\_ and show it to the examiner. 05
- Q.3. Preparation of \_\_\_\_\_ graph for enzymatic reaction. 03
- Q.3 Identify specimens 1 to 6 as per instructions: 09
1. Identify and give its application/use– (Instrument)
  2. Identify and write working principle – (Instrument)
  3. Identify the substance based on the given structure
- Q.4. Viva voice 03
- Q.5 Journal 03